CLAIMS

1. A method for production of three-dimensional bodies by successive fusing together of selected areas of a powder bed, which parts correspond to successive cross sections of the three-dimensional body, which method comprises the following method steps:
application of powder layers to a work table,
supplying energy from a radiation gun according to an operating scheme determined for the powder layer to said selected area within the powder layer, fusing together that area of the powder layer selected according to said operating scheme for forming a cross section of said three-dimensional body, a three-dimensional body being formed by successive fusing together of successively formed cross sections from successively applied powder layers, characterized in that said selected area is divided into a plurality of smaller part areas which each comprise an inner area I and an edge R.

2. The method as claimed in claim 1, characterized in that the inner area I of a set of adjacent part areas is fused together in a first process step, after which edges R belonging to said adjacent part areas are fused together and connect said part areas in a second, subsequent process step.

3. The method as claimed in claim 1 or 2, characterized in that the operating scheme is arranged so as to determine the priority for treating said plurality of smaller part areas with the aid of a random number generator.

4. The method as claimed in claim 1, characterized in that said edges are fused together in a first process step for a number of consecutive powder layers, after which the inner areas of said consecutive powder layers are fused together in a common second process step for said consecutive powder layers.

5. The method as claimed in any one of the preceding claims, characterized in that said inner areas are fused together in the course of a movement pattern for the focal point of the beam of the radiation gun which comprises a main movement direction and an interference term which is added to said main movement direction and has a component in a direction at right angles to the main movement direction.

6. The method as claimed in any one of the preceding claims, characterized in that said edges are fused together in the course of a mainly rectilinear movement of the beam of the radiation gun.

7. The method as claimed in any one of the preceding claims, characterized in that an energy balance is calculated for at least one part area within each powder layer, it being determined in the calculation whether energy radiated into the part area from the surroundings of the part area is sufficient to maintain a defined working temperature of the part area.

8. The method as claimed in claim 7, characterized in that, in addition to said energy for fusing together the part area, energy for heating the part area is supplied if the result of the energy balance calculation is that sufficient energy for maintaining an intended working temperature of the part area is not present, a defined working temperature of the part area then being achieved.

9. The method as claimed in claim 7 or 8, characterized in that the energy balance for each powder layer is calculated according to $E^{in}(i) = E^{out}(i) + E^{heat}(i)$, where $E^{in}(i)$ represents energy fed into the part area, $E^{out}(i)$ represents energy losses through dissipation and radiation from the part area, and $E^{heat}(i)$ represents stored in the part area.

10. The method as claimed in any one of claims 7-9, characterized in that an energy balance is calculated for each of said part areas.

11. An arrangement for producing a three-dimensional product, which arrangement comprises a work table on which said three-dimensional product is to be built up, a powder dispenser which is arranged so as to distribute a thin layer of powder on the work table for forming a powder bed, a radiation gun for delivering energy to the powder, fusing together of the powder then taking place, means for guiding the beam emitted by the radiation gun over said powder bed for forming a cross section of said three-dimensional product by fusing together parts of said powder bed, and a control computer in which information about successive cross sections of the three-dimensional product is stored, which cross sections build up the three-dimensional product, where the control computer is intended to control said means for guiding the radiation gun over the powder bed according to an operating scheme forming a cross section of said three-dimensional body, said three-dimensional product being formed by successive fusing together of successively formed cross sections from by the powder dispenser, characterized in that the control computer is arranged so as to divide said selected area into a plurality of smaller part areas which each comprise an inner area I and an edge R.

12. The arrangement as claimed in claim 11, characterized in that the radiation gun is arranged so as to fuse together the inner area I of a set of adjacent part areas in a first process step, after which said edges R are fused together and connect said part areas in a second, subsequent process step.

13. The arrangement as claimed in claim 11 or 12, characterized in that the operating scheme is arranged so as to determine the priority for treating said plurality of smaller part areas with the aid of a random number generator.

14. The arrangement as claimed in claim 11, characterized in that said edges are fused together in a first process step for a number of consecutive

powder layers, after which the inner areas of said consecutive powder layers are fused together in a common second process step for said consecutive powder layers.

15. The arrangement as claimed in any one of claims 11-14, characterized in that the operating scheme is arranged so as to guide the focal point of the beam of the radiation gun within said inner areas using a movement pattern which comprises a main movement direction and an interference term which is added to said main movement direction and has a component in a direction at right angles to the main movement direction.

16. The arrangement as claimed in any one of claims 11-15, characterized in that the radiation gun is arranged so as to fuse together said edges in the course of a mainly rectilinear movement of the beam of the radiation gun according to an operating scheme determined by the control computer.

17. The arrangement as claimed in any one of claims 11-16, characterized in that the control computer is also arranged so as to calculate an energy balance for at least one part area within each powder layer, it being determined in the calculation whether energy radiated into the part area from the surroundings of the part area is sufficient to maintain a defined working temperature of the part area.

18. The arrangement as claimed in claim 17, characterized in that the control computer is arranged so as to control said operating scheme for supply of, in addition to said energy for fusing together powder layers, energy for heating the powder layer if the result of the energy balance calculation is that the operating scheme is not providing sufficient energy for maintaining an intended working temperature of the part area, a defined working temperature of the part area then being maintained.

19. The arrangement as claimed in claim 17 or 18, characterized in that the control computer is arranged so as to calculate the energy balance for each powder layer according to E^{in} (i) = E^{out} (i) + E^{heat}(i), where E^{in} (i) represents energy fed into the part area, E^{out} (i) represents energy losses through dissipation and radiation from the part area, and E^{heat}(i) represents energy stored in the part area.

20. The arrangement as claimed in any one of claims 11-19, characterized in that the control computer is arranged so as to calculate an energy balance for each of said part areas.

21. The arrangement as claimed in any one of claims 11-19, characterized in that the arrangement also comprises means for sensing the temperature distribution of a surface layer located in the powder bed.